

## 7-6 Rational Zero Theorem

Solve, given that  $x+4$  is a zero.

$$x^3 - 11x + 20 = 0$$

$$\begin{array}{r|rrrr} -4 & 1 & 0 & -11 & 20 \\ & & -4 & 16 & -20 \\ \hline & 1 & -4 & 5 & 0 \end{array}$$

$$x^2 - 4x + 5 = 0$$

$$\frac{4 \pm \sqrt{16 - 4(1)(5)}}{2}$$

$$\frac{4 \pm 2i}{2} \quad \{2 \pm i, -4\}$$

Rational Zero Theorem --  $\frac{p}{q}$  a possible zero, where:

- $p \in$  set of integral factors of the constant
- $q \in$  set of the integral factors of the leading coefficient

Solve

$$0 = 6x^3 + 7x^2 - 9x + 2$$

$$p \in \{\pm 1, \pm 2\}$$

$$q \in \{\pm 1, \pm 2, \pm 3, \pm 6\}$$

$$\frac{p}{q} \in \{\pm 1, \pm \frac{1}{2}, \pm \frac{1}{3}, \pm \frac{1}{6}, \pm 2, \pm \frac{2}{3}\}$$

$$\begin{array}{r|rrrr} -2 & 6 & 7 & -9 & 2 \\ & & -12 & 10 & -2 \\ \hline & 6 & -5 & 1 & 0 \end{array}$$

$$6x^2 - 5x + 1$$

$$(3x-1)(2x-1) = 0$$

$$\{-2, \frac{1}{3}, \frac{1}{2}\} \quad x = \frac{1}{3} \quad x = \frac{1}{2}$$

Solve

$$x^4 - x^3 + 7x^2 - 9x - 18 = 0$$

$$p \in \{\pm 1, \pm 2, \pm 3, \pm 6, \pm 9, \pm 18\}$$

$$q \in \{\pm 1\}$$

$$\frac{p}{q} \in \{ \}$$

Solve.

$$0 = x^4 - 4x^3 + 6x^2 - 8x + 8$$

$$\eta \in \{\pm 1\}$$

Solve.

$$0 = x^4 - 6x^3 + 8x^2 - 48x$$

Solve.

$$0 = x^4 - 6x^3 + 8x^2 - 48x$$

GCF

$$x(x^3 - 6x^2 + 8x - 48)$$

**HW**

p381

13, 15, 19, 25, 28, 30